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ABSTRACT

Three hundred and fifty-three Pittsburgh school children were randomly assigned to nine classes taught by the basal approach and nine classes taught by the integrated experience approach. Five readiness measures were administered at the beginning of the first grade, and the Stanford Achievement Test was given in May of first, second, and third grades. Analysis of the data yielded the following findings: (1) significant relationships existed between the predictor variables and the criterion variables of reading achievement; (2) the Murphy Durrell Readiness Test and the Metropolitan Readiness Tests were the strongest contributors to prediction; (3) when unique subtests of the two tests were combined, the combination of the Word Meaning subtest of the Metropolitan with the three subtests of the Murphy Durrell resulted in the highest prediction-achievement correlation; (4) correlation between prediction and achievement did not drop significantly from grade to grade; (5) sex, mental age, and instructional method did influence the prediction accuracy; (6) the Pintner Cunningham Primary Test made a moderate contribution to prediction; and (7) the Banham Checklist and Thurstone Jeffrey Tests were not adequate predictor instruments. References are included. (AW)

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An Evaluation of the Predictive Value of Certain Readiness Measures

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There is some disagreement among educators concerning the value of reading readiness tests. Paradoxically, they were developed to solve a problem, not to create one. In 1930 Deputy (4) reported findings of Percival (1926) and Reed (1927) who concluded that 95-99% of school failures were due to failure in reading. Thus Deputy attempted to develop a test to serve as a predictive tool in determining which pupils had the ability necessary to be successful in reading. Standardized reading readiness tests emerged and their use gained impetus

as they won acclaim as reliable measuring instruments. Austin & Morrison (1) reported more than 80% of the 940 school systems which participated in the questionnaire survey of the Harvard Report used them to help determine when children should begin instruction in a formal reading program.

With the passage of time, innumerable research investigations have been conducted and points of view concerning readiness and readiness tests have changed. The concept of readiness has evolved from the belief that maturation was all that was necessary for reading success to the concept that reading readiness can be developed, that nature and nature and their interaction are essential ingredients for learning. While winning wide acclaim and use, readiness tests have been carefully scrutinized and highly criticized. Karlin (5) advocated that readiness tests were invalid predictors and Bremer (2) concluded that reading readiness tests should not be used to predict reading achievement with any degree of accuracy. To be sure, standardized readiness tests have been revised through the time period from 1930 to the present, but are they useful as predictor instruments today?

Purposes of the Study

To offer further data about the prediction of reading achievement in the early school grades, the present study was completed. The purposes of this study were to ascertain if

reading achievement can be predicted in grades one, two and three through certain standardized reading readiness and intelligence measures, published in the sixties, and to determine if this predictive ability is significantly related to method of instruction, sex differences or mental age. The following hypotheses were tested in this investigation:

1. There is no significant relationship between the intelligence and reading readiness test measures and reading achievement.
2. There is no significant relationship between the subtests within each readiness test (Murphy Durrell and Metropolitan) and reading achievement.
3. There is no significant relationship between the major contributing subtests of the various measuring instruments, in different combinations, used in this study and reading achievement.
4. There is no significant difference in the predictive ability of reading achievement from readiness measures when comparing grade one predictors to grade one achievement, to grade two achievement and to grade three achievement.
5. The ability to predict reading achievement is not significantly influenced by the method of instruction used or the organismic factors of sex and mental age; there is no interaction between these organismic factors and the method factor.

Design of Study

The sample population, of 353 Pittsburgh Public School children, was randomly assigned to eighteen classrooms. Nine of these classes were instructed through the Co-ordinated Language Arts materials of Scott Foresman Co. (Basal Approach) while the other nine used an integrated language arts program with language experience and individualized reading (The Integrated Experience Approach to Communication) which was developed at the University of Pittsburgh.

At the beginning of their first grade experiences, the children were administered readiness measures. (Banham Checklist - Maturity Level for School Entrance, 1960; Metropolitan Readiness Test, Form A, 1964; Murphy-Durrell Diagnostic Reading Readiness Test, revised edition, 1964; Thurstone Jeffrey Identical Forms and Pattern Copying Tests, 1964; and the intelligence measure of the Pintner-Cunningham Primary Test, Form A, 1964.) The appropriate Stanford Achievement Test was given to the same sample in May of first grade, second grade and third grade.

Fifty-three teachers participated in the investigation. The teachers were assigned to each classroom by the principal of each participating school. The teachers received supervision through pre-service and monthly workshops.

Statistical Analysis of Data

Specific statistical techniques of canonical correlation, 2x2x2 factorial analysis of variance, and Hotellings "t" test of significance of differences were applied to the data.

The first three hypotheses were tested by the use of the canonical correlation model. Originally developed by Hotelling in 1936, and described by Cooley and Lohnes (3), this method determines the relationships between linear functions of multiple predictor variables (the various readiness measures and intelligence measures) and multiple criterion variables (four subtests of the Stanford Reading Achievement Test). Geometrically the canonical model can be considered to be an exploration of the extent to which individuals occupy the same relative position in one test space as they do in the other. In addition to canonical correlations determined, the factor structure of each significant linear function is revealed to show which variables contribute most heavily to the maximally correlated components. Chi-square tests of significance were applied to determine the significance of correlations.

Hotellings "t" test was used to test the fourth hypothesis regarding the correlated data, while the fifth hypothesis was tested through the use of a 2x2x2 multivariate factorial analysis of variance.

Findings

Hypothesis 1:

To comply with the restrictions of the canonical model, that variables must not be linearly related, the six readiness variables were analyzed in two sets. Set 1 consisted of the Murphy Durrell Reading Readiness Total Score, Thurstone Pattern Copying Test and the Thurstone Identical Forms Test. Set 2 included the Banham Test of Social Maturity, Metropolitan Readiness and the Pintner Cunningham Intelligence Test.

Canonical correlations applied to total test scores revealed significant relationships (at the .001 level) between the predictor variables and criterion variables of reading achievement at each grade level (set one, .63, .64 and .60, Grades one, two, and three respectively, and set two .56, .53 and .54 Grades one, two, and three respectively. The factor loadings indicated that the Murphy Durrell Readiness Test and the Metropolitan Readiness Tests were the strongest contributors to prediction (.98 and .97 factor loadings at grade one, .97 and .92 at grade two; .96 and .97 at grade three).

Hypothesis 2:

This hypothesis was concerned only with tests made up of various subtests, namely the Murphy Durrell Reading Readiness Analysis Test and the Metropolitan Reading Readiness Test. Highly significant correlations (.001 level) were found between the predictor variables and the domain of reading achievement when both tests were examined.

It was found that all three subtests of the Murphy Durrell contributed significantly to the predictor domain. The Phonemes subtest was the strongest contributor in grades one and two (factor loading of .86 and .84 respectively) while total letter names was strongest in grade 3 (factor loading of .82). All subtests displayed factor loadings of .60 or higher at each grade level.

Three of the subtests of the Metropolitan,(Word Meaning, Numbers, Alphabet) exhibited factor loadings of .60 or higher at all three grade levels. Word Meaning was the strongest contributor at grade 1 (factor loading of .81) while the Alphabet subtest was strongest at grade 2 and grade 3 (.79 and .75 respectively). The other subtests, (Listening, Copying, and Matching) did not display factor loadings above .50 at any time.

Hypothesis 3:

In order to test this hypothesis, the canonical correlation technique was applied to ten different combinations of subtests of both of the predictor measuring instruments (Murphy Durrell & Metropolitan) and the criterion variables of reading achievement. Each test used in these recombinations gave previous evidence of a factor loading of .60 or higher in the statistical analysis of hypothesis one and two. Prior to recombination analyses, correlations ranged from .30 to .63. Correlations in recombination analyses changed in range from .55 to .67. The highest correlation of .67 was found using the Phonemes, Letter Names and Learning Rate subtests of the Murphy Durrell plus the Metropolitan Word Meaning subtest.

Hypothesis Four:

Tests of significance showed correlations did not drop significantly from grade to grade despite a downward trend. Therefore the ability to predict third grade reading achievement was almost as accurate as prediction in first grade.

Hypothesis Five:

The 2x2x2 multivariate analysis of variance determined that the factors of sex, mental age, and method of instruction influence the ability to predict accurately at the first grade level with the Murphy Durrell Test. Factors of mental age and method remained significant at the second grade level while none were significant at the third grade level.

Tests of significance applied to the mean scores of the Metropolitan Test indicated the same pattern as with the Murphy Durrell for the first two years. At the third grade level, however, the main effects of sex and mental age were also significant.

On the basis of these multivariate scores (that is taking into account all variables) over the three year period it is evident that the factors of sex, mental age and method do influence our ability to predict reading achievement.

An examination of cell means and univariate F tests revealed that the Murphy Durrell Test is better able to predict boys achievement than girls; is more accurate for high mental age students (6.5 years or higher) than low mental age and is a better predictor for children taught with the Basal Approach.

A similar examination revealed the Metropolitan is a more accurate predictor for girls than boys; for high mental age children in comparison to low mental age and for children taught through the Basal Approach in comparison to children taught through the Integrated Experience Approach.

Conclusions

As a result of the above findings one can conclude:

(1) Of the tests examined, the Murphy Durrell Reading Readiness Test demonstrates the strongest and highest relationship to reading achievement as it is measured by the Stanford Achievement test. In addition, it is least influenced by sex differences.

(2) The Metropolitan Readiness Test is the second best predictive instrument of those examined, however, the subtests of Matching, Copying, and Listening contribute little to predicting reading success. In an effort to save teacher - pupil time in administration, scoring, etc., it is suggested that these subtests should not be given. Sex differences also strongly influence the predictive ability of this test.

(3) The Pintner Cunningham Primary Test makes a moderate contribution to the domain of prediction. The factor loadings weaken over the time period, indicating that its predictive ability is not as stable as the other tests measured.

(4) The Banham Checklist - Maturity Level for School Entrance; Thurstone Jeffrey Identical Forms and Pattern Copying Tests would not serve as adequate predictor tools in comparison to the Murphy Durrell or Metropolitan Readiness Test.

(5) When unique subtests of the Murphy Durrell and Metropolitan tests are combined, the strongest relationship between the prediction and achievement domain is obtained by combining the Word Meaning subtest of the Metropolitan with the three subtests of the Murphy Durrell. The correlation remains relatively stable over the time period.

(6) The use of Phonemes and Letter Names in combination as a strong predictor gives verification to Dr. Donald Durrell's research that these are the two most important factors for predicting reading success. It also re-emphasizes the importance of developing skills of visual and auditory perception and discrimination.

(7) No significant differences were found when "t" tests were applied between the reading measures and each grade level's achievement, indicating third grade success can be predicted as well as first.

(8) The school administrator should consider the materials to be used in instruction when choosing tests because the tests examined in this study predicted better for children who were taught through the Basal Approach.

(9) There is a general trend for both the Murphy Durrell and the Metropolitan Tests to be more accurate predictors for children with mental ages of 6.5 years or older.

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